

## Augmented Reality Telepresence for Robotic Exploration

Completed Technology Project (2015 - 2019)



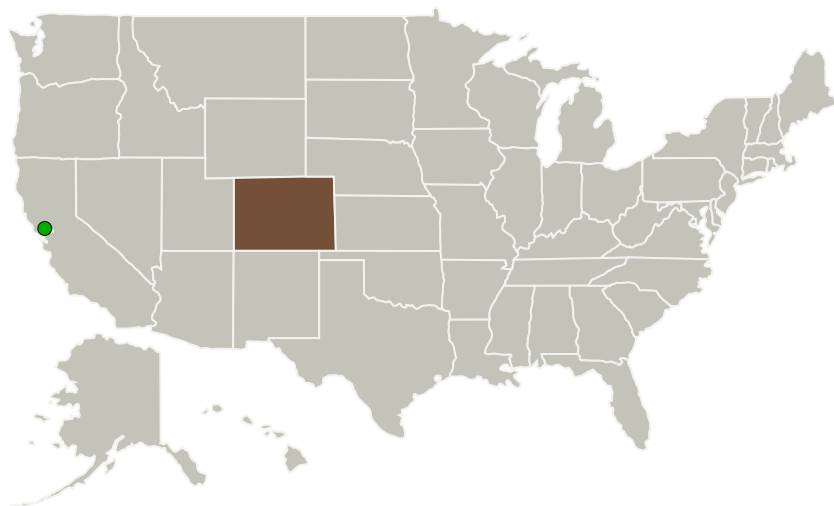
## Project Introduction

State of the art virtual reality requires low latency, on the order of single-digit milliseconds to present a scene to an operator using immersive tracking devices. In conventional teleoperation, the operator's movements are used to directly control a remote camera, requiring a fast response time to avoid simulator sickness, an approach not feasible for interplanetary robotic control with limited bandwidth, high latency communications. The proposed work develops a hybrid architecture to present a model of a coarse virtual world to an operator, while the real imagery slowly refines the presentation as bandwidth allows. An online physics engine allows an actuation command in the virtual world to be faithfully executed in the real world without direct operator feedback. The end goal is a smooth, visually realistic operator interface that allows for remote operation of an exploration vehicle in a blended world scene of virtual and actual data.

## Anticipated Benefits

The end goal is a smooth, visually realistic operator interface that allows for remote operation of an exploration vehicle in a blended world scene of virtual and actual data.

## Primary U.S. Work Locations and Key Partners



Augmented Reality Telepresence  
for Robotic Exploration

## Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Project Website:	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	3
Technology Areas	3
Target Destinations	3

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Organizations Performing Work	Role	Type	Location
University of Colorado Boulder	Lead Organization	Academia	Boulder, Colorado
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

## Primary U.S. Work Locations

Colorado

## Project Website:

<https://www.nasa.gov/strg#.VQb6T0jJzyE>

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

University of Colorado Boulder

**Responsible Program:**

Space Technology Research Grants

## Project Management

**Program Director:**

Claudia M Meyer

**Program Manager:**

Hung D Nguyen

**Principal Investigator:**

Nisar Ahmed

**Co-Investigator:**

Steve Mcguire

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## Technology Maturity (TRL)

Start: **2**  
Current: **3**  
Estimated End: **3**



## Technology Areas

### Primary:

- TX10 Autonomous Systems
  - └ TX10.2 Reasoning and Acting
    - └ TX10.2.4 Execution and Control

## Target Destinations

Earth, The Moon